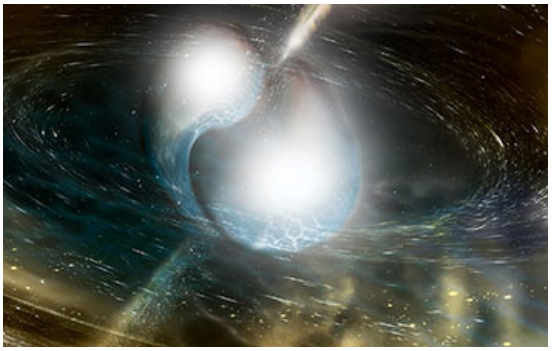
Quick Reads From NSF.gov

November 27, 2017

01



LIGO and Virgo make first detection of gravitational waves produced by colliding neutron stars

Three months ago, scientists directly detected gravitational waves -- ripples in spacetime -- in addition to light from the spectacular collision of two neutron stars. The discovery was made using NSF's Laser Interferometer Gravitational-Wave Observatory (LIGO) and the Europe-based Virgo detector, along with some 70 ground- and space-based observatories. The discovery, announced at a press conference on Oct. 16, marked the first cosmic event observed in both gravitational waves and light. "This discovery realizes a longstanding goal many of us have had, that is, to simultaneously observe rare cosmic events using both traditional as well as gravitational-wave observatories," noted NSF Director France A. Córdova. View an archive of the press conference. Find out more about LIGO in this NSF Special Report.

02

2017 Nobel Prizes continue the NSF connection

When the Nobel Prizes were announced earlier this month, eight of the new laureates had received support from NSF at some point in their careers. Rainer Weiss, Kip Thorne and Barry Barish were awarded the Nobel Prize in physics "for their work detecting gravitational waves." The three scientists lead the development of NSF's LIGO. The Nobel Prize in physiology or medicine was awarded jointly to Jeffrey C. Hall and Michael Rosbash and Michael W. Young "for their discoveries of molecular mechanisms controlling the circadian rhythm." NSF had supported their research on biological clocks. NSF-supported researcher Joachim Frank shared the 2017 chemistry Nobel Prize, along with Jacques Dubochet and Richard Henderson, "for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution." Richard H. Thaler was awarded the economics prize "for his contributions to behavioral economics." He received NSF support through grants to investigate decision-making under risk, launching behavioral economics as a field of basic research. NSF has provided support to a total of 231 Nobel laureates. Read more about the 2017 winners in the NSF special report Nobel Prizes—The NSF Connection.

03

Students invited to transform ideas and change the world

It's back! NSF and the American Association of Community Colleges (AACC) recently launched the fourth annual Community College Innovation Challenge (CCIC). CCIC is a two-stage competition that calls on teams of three-to-five community college students, alongside a faculty mentor and a community/industry partner, to use science, technology, engineering and mathematics to innovate solutions to real-world problems, compete for cash awards and earn full travel support to attend an innovation boot camp in Washington, D.C. Find out more about the competition, including how to enter, in this NSF Special Report.

04

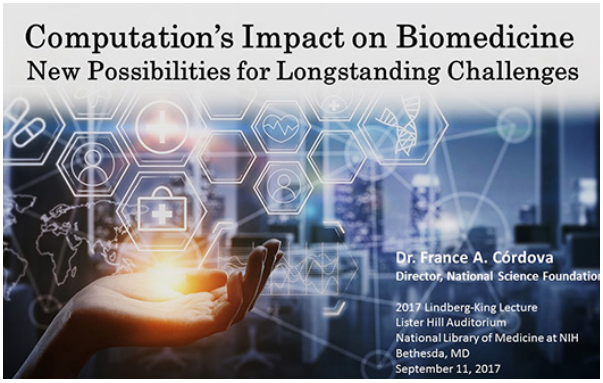
Can you feel it? Brain-computer interface and robotic arm restore sense of touch

From buttoning a shirt to grasping a cup, the ability to manipulate objects is aided by the sense of touch. Traditional prosthetics limit patient function because they don't provide this key sense. Earlier this year, however, a quadriplegic man experienced the sense of touch again. A robotic arm connected to a brain-computer interface (BCI) implanted in his head allowed him to "feel" pressure on the robotic hand. The blueprint for the BCI-robotic arm system came from NSF-funded basic research. This is one example of thousands of research outcomes that have a real-world impact. Check out the new series of NSF Impacts.

05

France A. Córdova at the Lindberg-King Lecture at NIH

NSF Director France A. Córdova gave the annual Lindberg-King Lecture at the National Institutes of Health (NIH) in September. She discussed the significance of NSF's and NIH's partnership and presented NSF's vision for breakthroughs in biomedicine through the agency's Big Ideas for Future Investment. "Every day, NSF and NIH prove the importance of federal funding in research," Córdova said. "Our two agencies resulted from people who believed that applying resourceful thinking to longstanding societal problems would lead to the advancement of our nation. It is only natural that NSF and NIH would have a long, productive partnership." Read the Director's complete remarks.



06

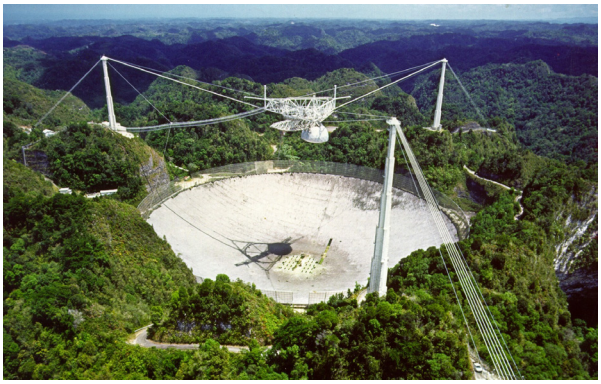
How NSF helps drive the nation's economy

NSF research underpins vast segments of the American economy, enabling growth across the spectrum of American industry. This video looks at how NSF investments in basic research and people are critical to maintaining the scientific and technological edge that drives U.S. economic growth. View or download the video to find out more.

07

Arecibo: Statement on NSF Record of Decision

NSF has signed its Record of Decision for the Arecibo Observatory in Puerto Rico. This important step concludes the agency's decision-making process with respect to the general path forward for facility operations in a budget-constrained environment and provides the basis for a future decision regarding a new collaborator. Find out more in this NSF Press Statement.



08

Veterans helping veterans through research

Honoring veterans' military service and attending to their re-entry into civilian life are important parts of how the nation celebrates veterans this month. For some veterans, re-entry may involve enrolling in college. Making the move from life in the military to life on a college campus can be challenging. A program at Syracuse University's Falk College addresses this challenge by training undergraduate students, including veterans, to conduct research on the effects of trauma in veteran populations. Part of a Research Experiences for Undergraduates (REU) site funded by NSF, the Training Diverse Undergraduate Teams of Veterans and Non-Veterans to Conduct Trauma Research with Veterans program helps students look at the chemical, clinical, cognitive and family factors associated with the various outcomes of trauma. To learn more, check out this Discovery.

09

NSF announces four new ERCs

NSF has invested nearly $80 million in four new Engineering Research Centers (ERCs) to create novel technology platforms to address national challenges in health and energy sustainability. "For over 30 years, NSF Engineering Research Centers have promoted innovation, helped to maintain our competitive edge, and added billions of dollars to the U.S. economy," said NSF Director France Córdova. The new centers are: the ERC for Innovative and Strategic Transformation of Alkane Resources (CISTAR), the ERC for Cell Manufacturing Technologies (CMaT), the Nanosystems ERC for Cellular Metamaterials (CELL-MET) and the ERC for Precise Advanced Technologies and Health Systems for Underserved Populations (PATHS-UP). Find out more in this NSF News Release.

10

Autumn forecasts winter weather

Experimental real-time weather forecasts, which incorporate satellite observations of snow cover into a prediction model, have led to a new understanding of the relationship between fall snow cover and winter climate variability. Researchers are taking winter weather forecasting beyond El Niño by investigating the relationship between Siberian snow cover in fall months and Northern Hemisphere climate variability during the winter. A forecast model by an NSF-funded researcher has achieved on-target forecasts for major cities in the industrialized countries. The 2017-18 winter forecast shows below normal temperatures for the northern and eastern U.S., with above normal temperatures in the southwestern and southcentral U.S. The winter precipitation forecast shows above normal precipitation across the northern U.S. and below normal precipitation across the southern U.S. Find out more about this season's winter weather predictions in this Special Report.

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